

the "spades" or "hoes," "oval plates of flint flat on one side and slightly convex on the other, the outline being chipped to a sharp edge." These differ principally from the European implements, which most nearly approach them, in their greater thinness. It is possible that they may have been used for agricultural purposes, and some bear traces of use, such as digging in sandy soil would produce.

Fragments of pottery are very abundant in New Jersey, but "unbroken articles of earthenware are rarely met with."

"A large portion of the pottery made by the Indians, however, was not made from pure clay just as it came from the bed, but the clay-earths that overlie the others were utilised and made available by mixing with them quartz granules and pounded shell. Much of the pure clay, which in many places was accessible, would need far more manipulation than the Indian potters would care to give it, and as the mixture of clay and shell was simpler and would meet all their requirements, it was, very naturally, most frequently used. They nevertheless possessed the knowledge of successfully working in pure clay, as sherds are found so made, and their well formed clay smoking pipes are a further proof of the fact."

The forms are generally simple, and the ornamentation rude. The patterns are almost, if not quite, invariably geometrical; and generally made either with a pointed stick or bone, with the thumb-nail, with a twisted cord, or by covering the vessel, of course when soft, with coarse cloth.

Copper implements are comparatively rare, and Dr. Abbott is disposed to think that they—

"Were never designed for use as weapons or implements, but were intended for display upon special occasions, as for instance in their various dances, when much ceremony was observed, and various objects were displayed that at other times remained hidden in the custody of their fortunate owners, or of the appointed keepers, if tribal property."

He is clearly of opinion that they were merely hammered into form and never cast. They are always of very simple form.

As already mentioned, in one county of New Jersey alone Dr. Abbott has gathered no less than 20,000 stone implements. No one implement or pattern is peculiar to any one district, though certain forms abound in particular localities.

"Although in no instance has any one pattern of arrow-head been found so characteristic of a given locality as are the argillite fish-spears of the alluvial deposits along the river, it has frequently been observed by collectors that some particular form occurred in considerable numbers in a locality of very limited area, as a field or other small plot of ground. In my own collecting tours I have frequently noticed this, and can recall now certain fields that appeared to have only leaf-shaped arrow-heads, and others where the triangular pattern was alone met with. Even this is noticeable with other forms of chipped implements, and local collectors report fields, or other spots of a few acres, where only scrapers are found. This localising of certain forms has been so frequently noticed that it cannot be considered as a mere chance occurrence, yet it is scarcely susceptible of any rational explanation."

Dr. Abbott is of opinion that the Eskimo occupied New Jersey long before the advent of the Red Indian. To

this earlier race he especially ascribes the implements made of argillite, which he regards as much older than the rest. Altogether he has found 4400 implements of this material, 233 being well-made drills or perforators and scrapers, the others spear-points, fishing-spears, arrow-heads, and knife-like implements. They are altogether ruder than the implements of flint and other materials, but

"Although it is true of these implements that they are of more primitive forms, and therefore probably older than the objects made of quartz and jasper, the argument does not rest so much upon this greater simplicity, as upon their decomposed condition, their occurrence at greater depths in the undisturbed soil, the greater adaptability of the spears for fishing purposes, and the absence of all indications in the deeper soils, of the utilisation of the minerals habitually used by the later Indians."

"For these reasons," he continues (p. 463), "it is claimed that we find sufficient evidence in them of a pre-Indian people—believed to be the Eskimo—who, it is further claimed, are the direct descendants of that still older race, the fabricators of the Palæolithic implements of the River Drift."

To many minds the most interesting question raised by Dr. Abbott's work will be the evidence as to the antiquity of man in America. Certainly some of the implements which he has discovered seem to belong to palæolithic types. In some cases he assures us they have been found in association with remains of the mastodon, and he is satisfied that those found in the Trenton gravels must be coeval with the gravels themselves.

The work concludes with a memoir by Prof. Henry Carvill Lewis on the Antiquity and Origin of the Trenton Gravel Beds. Prof. Cook is of opinion that they are of glacial origin, and derived from floods caused by the melting of a great continental ice-sheet. Prof. Lewis, on the contrary, maintains that they are post-glacial—in fact, a true river gravel of comparatively recent age. It cannot, he maintains, be assigned to the glacial epoch, except by assuming that there have been no river gravels deposited since that time, an assumption which he regards as quite untenable. On the whole, he concludes that there is no evidence which would render it necessary to assign to those gravels, or of course to the implements found in them, an antiquity of more than 10,000 years.

SACRED MYTHS OF POLYNESIA

Die heilige Sage der Polynesier—Kosmogonie und Theogonie. Von Adolf Bastian. (Leipzig: Brockhaus, 1881.)

PROF. BASTIAN, on a late journey made to enrich the Ethnological Museum of Berlin, stayed a short time in New Zealand and the Sandwich Islands, and there gathered some interesting information as to native traditions, some not yet published, and some which have been neglected (if ever met with) by European students. The documents now printed in a small volume all strengthen the opinion which has for years been gaining ground among anthropologists as to the civilisation of the Polynesians. It is true that they were found in Capt. Cook's time living in a barbaric state, and their scanty clothing and want of metals led superficial observers even to class them as savages. But their beliefs and customs

show plain traces of descent from ancestors who in some way shared the higher culture of Asiatic nations. At Wellington Prof. Bastian found Mr. John White, who, as a skilled translator of Maori, worked for Sir George Grey in bringing out the "Polynesian Mythology," and has been engaged in the study of native lore ever since. He is about to publish the results of his long study with the aid of the Colonial Government, and we have here as a specimen one of those mystic Maori cosmogonies which make us fancy we are hearing some Buddhist or Gnostic philosopher pour out his dreamy metaphysics about the origin of things. Out of the Primal Night, says the Maori poet, there divided itself Nothing, then came Darkness, then Seeking, and Following, and then such stages as Conception of Thought, Spirit Life, Desire, Coming into Form, Breath of Life, Space. All this is of a piece with the native Polynesian poetry in Taylor's "New Zealand," and that lately published by Judge Fornander in Hawaii. The poem that begins with the time when there was no voice nor sound, no day nor night, may remind us of the famous hymn of the Rig Veda that begins "Nor aught nor naught existed." We find here the well-known chant of Taaroa, how in the emptiness of space, when there was no earth nor sky nor sea, Taaroa passing into new forms became the foundation of the rocks and the sand of the sea, and the land of Hawaii was born as his shell. Prof. Bastian well compares this with the Scandinavian poem in the Edda, how there was no sand nor sea nor salt waves, no earth nor sky above, till Bør's sons made the mighty Midgard—earth. He points out, as he has already done, the curious likeness between the Scandinavian story of the fishing up of the monstrous Midgard-snake; and the South Sea Island tale of Maui fishing up the island of New Zealand. Not less striking is such an analogy as the Polynesian Taaroa mating with his own energy in female form, like a Hindu god with his Sakti. The author may well ask, are these people, with such far echoes of Crphic, Chaldean, Buddhist philosophy, the simple playful children of nature on whom we look down as representing the lowest rungs in the ladder of development? In Hawaii the German anthropologist learnt much from King Kalakaua, who is thoroughly initiated in the religious ideas of his royal predecessors, who used to have the eyes of their enemies offered them by the high priest in the stone bowl which his majesty still keeps as a curiosity. Out of the royal library he produced a MS. temple-chant, written about the beginning of this century, containing a cosmogony, of which Prof. Bastian reproduces as much as he had time to have translated. It has real poetry in it, and as a piece of child-like philosophy it is not without interest in its enumeration of the orders of beings, the grubs and worms, the sea-eggs and mussels, the seaweed in the ocean watched by the grass on land, the cranes and the gulls at sea watched by the hawks on land, and so on with trees and other creatures, till at last the gods come into being, and man rises out of the night. For a specimen of barbaric science may be mentioned the Maori myth told to the author by Mr. Davis, how the Moon arose out of the ocean, and still keeps the traces of this marine origin in its phases, which follow the ebb and flow of the tide.

EDWARD B. TYLOR

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The Struggle of Parts in the Organism

ALTHOUGH I agree with the Duke of Argyll that the pages of NATURE are not adapted to a discussion on the general question of Theism, the letters which you this week publish leave me no alternative but that of entering upon the subject, so far at least as it seems desirable that I should now express my individual opinion on the points which your correspondents have raised.

My statement of what I conceive to be the position of the matter may best be rendered by answering first the questions which are put to me by Dr. Carpenter. He desires me to explain the "precise sense" which I attach to the phrase, "a general law whose operation is presumably competent to produce any set of phenomena," and proceeds in a most terse and lucid manner to expound the well-known and unquestionable truth that "in the purely scientific sense a 'law of nature' is nothing more than a general expression of a certain set of uniformities which the intellect of man discerns in the surrounding universe," &c. This is the only sense in which I have intended to use the term, and if my meaning has been obscured by speaking of a general law "producing" any set of phenomena, it is only because the idea of "a law of nature" as "any kind of coercive agency," or indeed anything other than "a generalised expression of facts," was so far from my mind that I perhaps too readily employed a convenient, though metaphorical, mode of expression—just as one speaks of the sun rising, &c. In speaking then of Natural Selection as "competent to produce" certain phenomena I only meant that, given a certain set of activities and conditions supposed to be uniform, and the phenomena in question would occur, whether or not these activities and conditions are taken to be due to a disposing mind. So far, therefore, am I from maintaining "that there is anything in the law of Natural Selection that places it in a different category from every other," that my whole contention is exactly the reverse—namely, that the law of natural selection stands to certain observed phenomena of biology in just the same logical relation as, for instance, the law of gravitation stands to certain observed phenomena of astronomy. Indeed, it is just because I hold the laws of evolution to be so precisely identical in logical status with all other so-called laws of nature, that I see no better evidence of Design in "the adapted structures" of "the Human Hand" than I do in the adaptation, say, of a river to the bed which it has itself been the means of excavating.¹ In both cases I believe that physical causes have been at work (whether or not there have been metaphysical causes of a mental nature behind them), with the difference only that the one set are more complex and less obvious than the other. But in each case alike, if the physical causes are deemed adequate to furnish a scientific explanation of the effects, there is no residual effect to be carried over for explanation by any metaphysical theory of Design. Design, of course, there may be in both cases; I only maintain that if the laws of evolution are conceded to stand to the structure of an organism in the same logical relation as certain other natural laws stand to the structure of a river's bed, then, *ex hypothesi*, the one set of adaptations constitutes no evidence of Design different in kind from that furnished by the other.

This appears to be the point where my opinion has had the misfortune to be found at variance with that of the Duke of Argyll. For in his last letter he says that "there are in nature a few [many, *vide infra*] cases of apparent adaptations and of

¹ I.e. "metaphorical" as investing a natural "law" with the significance of a natural "cause." A law of nature I take to mean a general proposition or formula which expresses the observed operation of certain physical causes, whether or not these are known. Therefore, although it is, strictly speaking, incorrect to say that "natural selection is a law competent to produce adaptations," in using such a form of expression one may be understood to mean "the sundry physical causes, whose joint operation is formulated by the law of natural selection, are competent to produce," &c.

² This illustration is borrowed from Mr. Wallace, who, in his "Natural Selection," elaborates it very instructively.